PROC. ENTOMOL. SOC. WASH
100(4), 1998, pp. 731–741

ON THE IDENTITY OF *HOLCOCERA GUILANDINAE* (BUSCK 1900) (LEPIDOPTERA: GELECHIOIDEA: COLEOPHORIDAE: BLASTOBASINAE)

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Abstract.—Adults of *Holcocera guilandinae* (Busck 1900) can be confused with two other species, *H. crassicornella* Dietz 1910, and *H. grenadensis* (Walsingham 1897). A **lectotype** is designated for *Blastobasis grenadensis*, and this species is transferred from *Blastobasis* Zeller 1855 to *Holcocera* Clemens 1863 (**n. comb.**). All three *Holcocera* species are redescribed herein, with complete synonymies given. Photographs of imagos, illustrations of the male and female genitalia and wing venation, and a key to the species are provided.

Key Words: *Holcocera*, Holcocerini, *crassicornella, grenadensis, guilandinae*

The blastobasine moths are probably one of the most frequently collected groups of Gelechioidea in the Americas. Yet, they remain one of the least known to science. Generally, species of Blastobasinae are drab with few diagnostic wing color patterns. This characteristic crosses specific, generic, and even familial boundaries, and makes identification difficult, if not impossible, unless genitalia are examined.

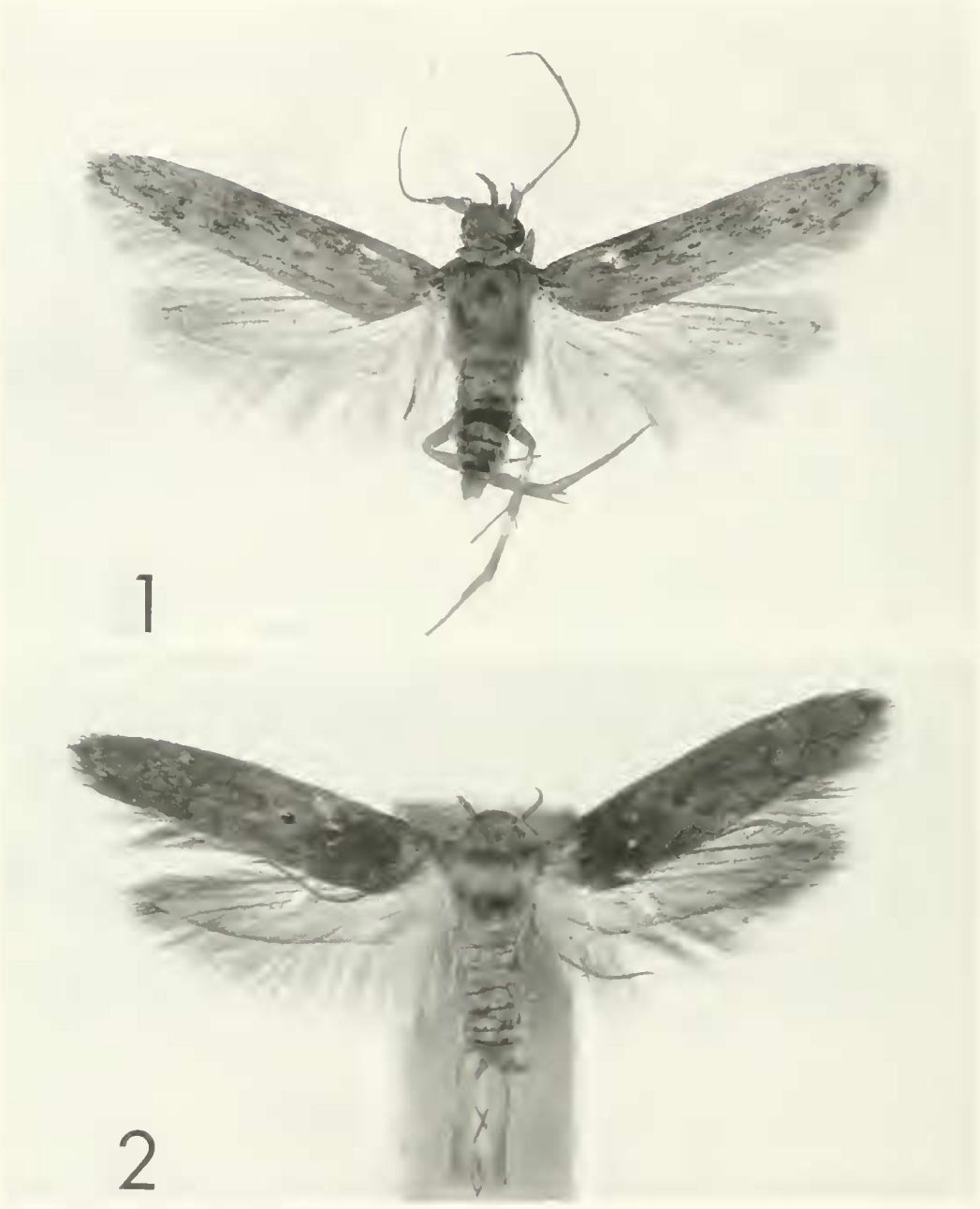
Hypotheses of relationships based primarily upon limited character systems, like wing venation, often result in unnatural or paraphyletic groups. More natural groups or monophyletic groups result when characters of the head, venation, genitalia, and others are incorporated into a phylogenetic analysis. Many genera have come and gone as a result of this change from single character system analysis to a multiple character system analysis.

The 16 genera of Blastobasinae listed by Hodges (1983) were proposed by previous lepidopterists using primarily head and venational characters. A multiple character system for phylogenetic analysis used by Adamski and Brown (1989) recognized this proliferation of artificial taxa and presented a phylogenetic classification that contained only seven genera, including *Holcocera* Clemens 1863.

Holcocera is defined by the following combination of characters: ventrolateral margin of gnathos weakly fused with tegumen, anellus multisetose, and proximal flange of valva with laterally dilated apex. Species of *Holcocera* feed on a variety of hosts that are summarized by Adamski and Brown (1989).

Hodges (1983) listed 57 species and varieties within *Holcocera*. Adamski and Brown (1989) listed 28 species and varieties, and Adamski and Hodges (1996) only eight. The numbers of valid species decreased because of species transfers and synonymy.

The closely similar wing patterns of *Holcocera guilandinae, H. crassicornella*, and *H. grenadensis* have resulted in misidentifications in museum collections as well as confusion with other species. The goals of this study are to clarify the taxonomic re-



Figs. 1–2. Imagos. 1, *Holcocera guilandinae*. 2, *H. crassicornella*.

lationships among these species and to provide efficient means for their identification.

The *Methuen Handbook of Colour* (Kornerup and Wanschner 1983) is used as a color standard for the description of the adult vestiture. Genitalia were dissected following Clarke (1941), except mercurochrome and chlorazol black were used as stains. Pinned specimens and genital preparations were examined with dissecting and compound microscopes. Wing measurements were made using a calibrated ocular

Fig. 3. Imago of *Holcocera grenadensis*.

micrometer. The acronym USNM is used for The National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Results

Key to the Species of *Holcocera* Confused with *H. guilandinae*

1. Male 2
– Female 4
2. Basal area of forewing darker than distal part (Fig. 2); uncus slightly widened basally, abruptly narrowed at ⅔ length to apex; dorsal margin of gnathos lobelike (Fig. 6) . . . . . *crassicornella*
– Basal area of forewing not darker than distal part (Figs. 1, 3); uncus and gnathos not as above 3
3. Uncus stout; dorsal margin of gnathos entire; base of costal lobe of valva slightly arched dorsally; longitudinal notch of anellus shallow; aedeagal cornuti absent (Fig. 5) . . . . . *guilandinae*
– Uncus narrow throughout length; dorsal margin of gnathos notched; base of costal lobe of valva strongly arched dorsally; longitudinal notch of anellus deep; aedeagus with several cornuti (Fig. 7) . . . . . *grenadensis*
4. Basal area of forewing darker than distal part (Fig. 2) . . . . . *crassicornella*
– Basal area of forewing not darker than distal part (Figs. 1, 3) 5
5. Inception of ductus seminalis near to A-7; inception of ductus seminalis not on enlarged part of ductus bursae; signa not equal in size (Fig. 8) . . . . . *guilandinae*
– Inception of ductus seminalis distant to A-7; inception of ductus seminalis on enlarged part of ductus bursae; signa of subequal size (Fig. 10) . . . . . *grenadensis*

Holcocera guilandinae Busck 1900 (Figs. 1, 4–5, 8)

Blastobasis guilandinae Busck 1900: 234, pl. 1, Fig. 9; Dyar 1901: 476; Busck 1902: 96; Dyar [1903]: 528; Smith 1903: 115; Barnes and McDunnough 1917: 162; McDunnough 1939: 79; Kimball 1965: 284; Hodges 1983: 14; Becker 1984: 41.

Holcocera guilandinae: Adamski and Brown 1989: 24; Ferguson et al. 1991: 20; Adamski and Hodges 1996: 715.

Diagnosis.—Forewing with dark-brown scales on distal portions of R_1-CuA_1; dark-brown scales within cells of R_1-CuA_2 forming an irregular serrate pattern near wing margin; uncus stout, basally widened; dorsal margin of gnathos entire; base of costal lobe of valva slightly arched; longitudinal

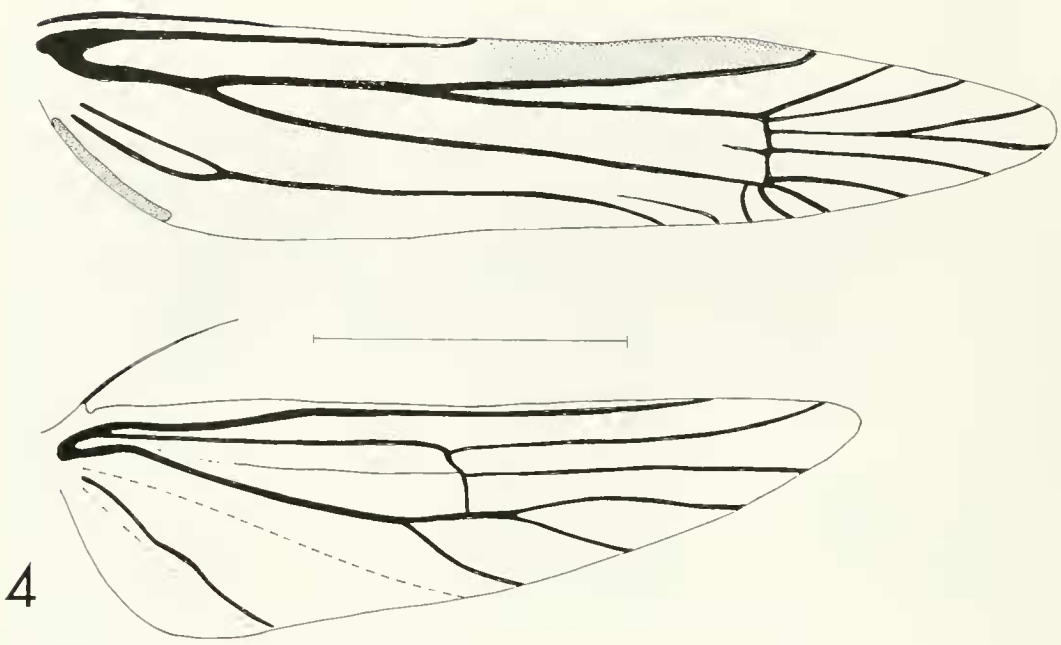
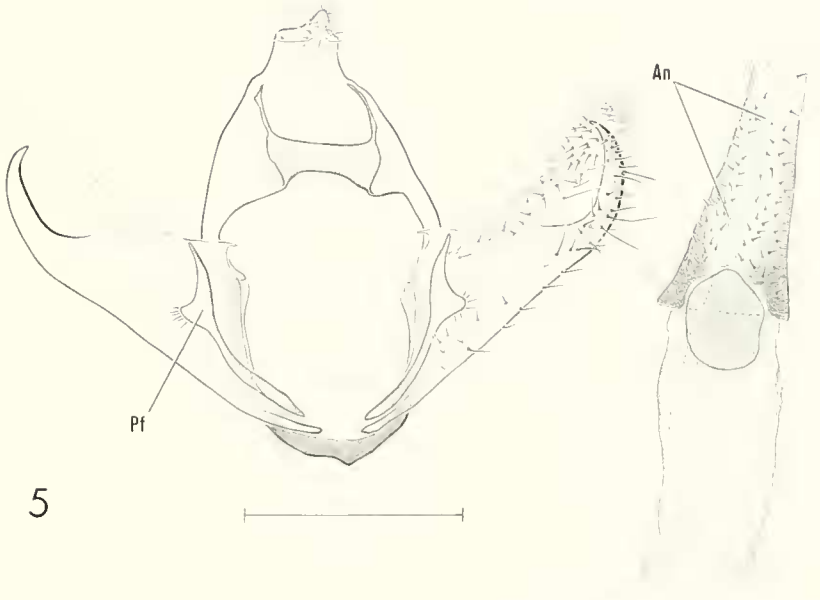


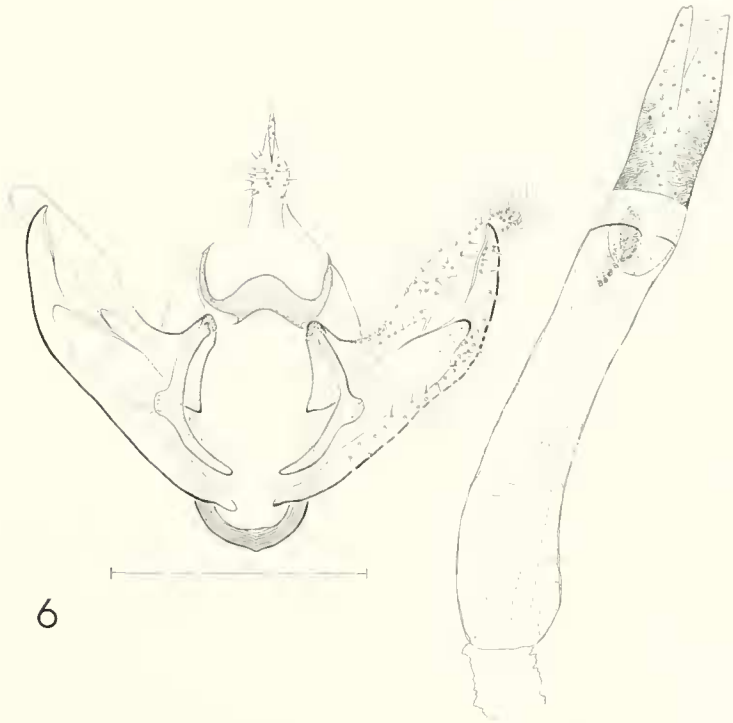
Fig. 4 Wings of *Holcocera guilandinae*. Scale = 1.0 mm.

notch of anellus shallow; cornuti absent; signa unequal in size.

Description.—*Head*: Scales on frontoclypeus and vertex brown or pale brown tipped with white; scape and pedicel with pale-brown scales intermixed with brown scales dorsally, uniformly pale brown ventrally; pecten pale brown; flagellomeres pale brown dorsally, dark brown ventrally; male first flagellomere notched; outer surface of segments 1–2 of labial palpus with dark-brown scales tipped with white intermixed with brown and pale-brown scales tipped with white, inner surface white intermixed with brown and pale-brown scales tipped with white, white apically; terminal segment dark brown intermixed with paler brown scales; proboscis white.

Thorax: Mesonotum pale brown, or pale brown with narrow, transverse brown band on anterior part; tegula pale brown or with pale-brown scales tipped with white. *Legs*: Forecoxa with outer surface pale brown intermixed with brown and pale-brown scales tipped with white; femur, tibia, and tarsomeres dark brown intermixed with brown and pale-brown scales tipped with white, apices of tarsomeres white; midfemur and tibia white basally, dark-brown scales intermixed with pale-brown scales from near midsegment to white apex; hindtibia white; hindtibia similar to midtibia; inner surface of each leg white, except foretibia with basal and subapical areas intermixed with brown and dark-brown scales; all tibial spurs white. *Forewing* (Figs. 1, 4): Length 6.1–9.2 mm (n = 88): Ground color pale brown intermixed with brownish-orange and brown scales; costal margin from base to pterostigma dark brown intermixed with brownish-orange and pale-brown scales; area between anal angle and CuP brown intermixed with pale-brown scales, some specimens with dark-brown scales intermixed with brown and pale-brown scales; dark-brown scales on distal portion of R_1-CuA_1 and dark-brown submarginal scales within cells of R_1-CuA_2 form an irregular serrate pattern near wing margin; discal cell with a brown spot near middle, two dark-brown spots (parallel to the longitudinal body axis) near distal margin of cell; ven-





Figs. 5, 6. Male genitalia. 5, *Holcocera guilandinae*. 6, *H. crassicornella*. Scale = 0.5 mm.

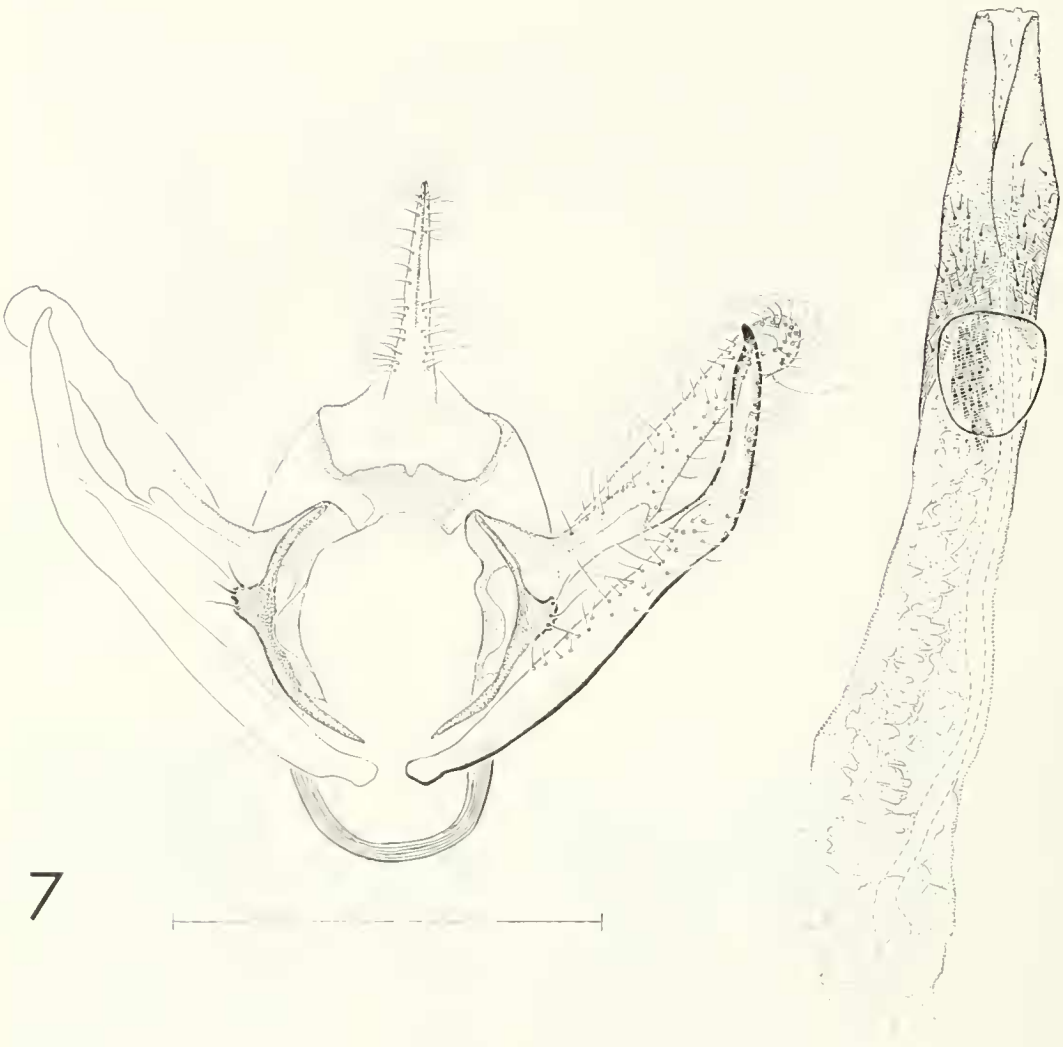


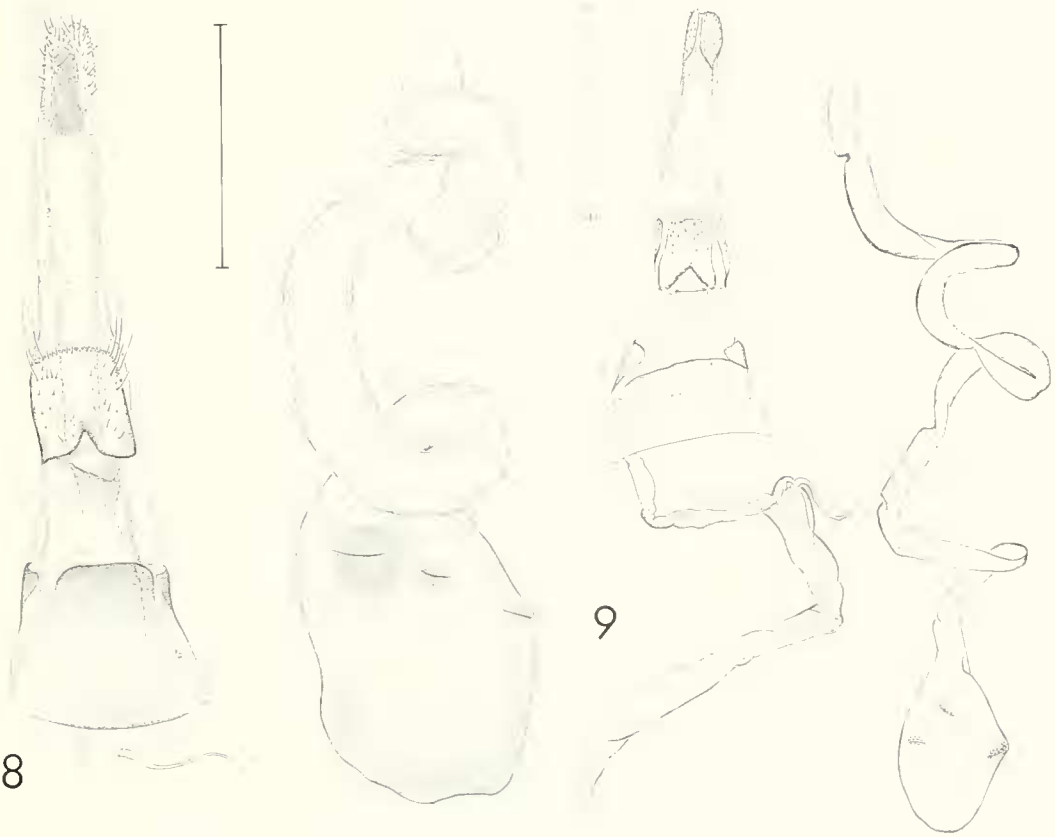
Fig. 7. Male genitalia of *Holcocera grenadensis*. Scale = 0.5 mm.

tral surface mostly brown, except distal portion of wing with brown scales tipped with white or pale-brown scales tipped with white. *Hindwing*: Dorsal and ventral surfaces with pale-brown scales basally, gradually darkening to apex, scales on veins usually darker than ground color; Cubitus 3-branched, M_2 and M_3 fused for entire length (Fig. 4).

Abdomen: Pale gray.

Male genitalia (Fig. 5): Uncus stout, basally widened, slightly extended posteriorly, setose; gnathos weakly fused ventrolaterally with tegumen, dorsal margin entire; vinculum narrow (as in all Holcocerini); costal and saccular parts of valva setose; base of costal lobe of valva slightly arched; proximal flange with a lateral lobelike setose process; anellus setose, with shallow, irregular, transverse grooves, without longitudinal notch at base; aedeagal cornuti absent.

Female genitalia (Fig. 8): Ovipositor telescopic, with three membranous subdivisions posterior to sternum-8 (as in all Holcocerini); anterior margin of sternum-8 emarginate, approximate to ostium; anterior



Figs. 8–9. Female genitalia. 8, *Holcocera guilandinae*. 9, *H. crassicornella*. Scale = 1.0 mm.

apophyses extending slightly beyond posterior margin of segment-8; ductus bursae moderate in length, irregularly spiralled; inception of ductus seminalis arising slightly anterior to A-7; corpus bursae trisignate, larger posteromedian signum at least twice length of other signa.

Types.—Lectotype ♂, [Designated by Adamski and Hodges 1996] "From stem of *Guilandinae bonducella*, iss[ued] Mar[ch] 30, 1900" [hand-written label]; "Palm Beach Fl[orid]a"; "USNM Type no. 4942" [red label]; "*Blastobasis guilandinae* Busck, ♂" [hand-written label]; "USNM ♂ genitalia slide 80980, DA 2410" [green label]. The lectotype is in the USNM. Paralectotype 1 ♀, "From stem of *Guilandinae bonducella*, Palm B[each] Fl[orid]a, iss[ued] Mar[ch] 30, 1900" [hand-written label]; Palm Beach Fl[orid]a"; "USNM Type no. 4942" [red label]; *Blastobasis guilandinae* Busck, Type ♀" [hand-written label]; "USNM ♀ genitalia slide no. 80977, DA 2407" [green label] The paralectotype is in the USNM.

Host.—*Caesalpina* [= *Guilandina*] *bonducella* Linnaeus (Fabaceae); *Garberia heterophylla* (Bartram) (Asteraceae); *Yucca* sp. (Liliaceae).

Distribution.—Southern Florida and Bermuda.

Holcocera crassicornella Dietz 1910
(Figs. 2, 6, 9)

Holcocera crassicornella Dietz 1910: 32; Barnes and McDunnough 1917: 162; McDunnough 1939: 80; Hodges 1983: 15; Adamski and Brown 1989: 24; Adamski and Hodges 1996: 714.

Blastobasis eriobotryae Busck 1915: 85;

Barnes and McDunnough 1917: 162; McDunnough 1939: 80; Kimbal 1965: 284; Hodges 1983: 14; Becker 1984: 41; Adamski and Hodges 1996: 714 (new syn.).

Holcocera eriobotryae: Adamski and Brown 1989: 24.

Diagnosis.—Basal part of forewing brown to near midcell spot; uncus slightly widened at base, abruptly narrowed at 3/5 length to apex; dorsal margin of gnathos lobelike; cornuti subequal in size.

Description.—*Head*: Scales on frontoclypeus and vertex grayish brown tipped with white, darker to vertex; scape and pedicel with pale-brown scales intermixed with darker brown scales, pecten pale brown; flagellomeres in female with pale-brown scales tipped with grayish brown; flagellomeres in male with scales uniformly pale brown; male first flagellomere notched; outer surface of segments 1–2 of labial palpus dark brown intermixed with pale-brown scales, mostly white nearly to apex, inner surface with pale-brown scales intermixed with darker brown scales; terminal segment brown, intermixed with pale-brown scales; proboscis pale brown.

Thorax: Mesonotum pale brown with a narrow transverse brown band on anterior part; tegula brown basally, pale brown apically; legs as in *H. guilandinae*. *Forewing* (Fig. 2): Length 5.5–7.8 mm (n = 150): Ground color grayish brown intermixed with pale-brown scales and few brown scales; wing base mostly pale brown intermixed with brown scales, brown to near midcell spot; two spots near distal margin; ventral surface pale brown. *Hindwing*: As in *H. guilandinae*.

Abdomen: Pale grayish brown.

Male genitalia (Fig. 6): Uncus slightly widened at base, abruptly narrowed at 3/5 length to apex, slightly extended posteriorly, setose; dorsal margin of gnathos lobelike; costal lobe of valva acutely arched dorsally at base; lobelike process of proximal flange setose; anellus as for *H. guilandinae*, except deeply notched; aedeagus with several subequal cornuti.

Female genitalia (Fig. 9): As for *H. guilandinae* except inception of ductus seminalis on slightly dilated part of ductus bursae, ductus bursae long; corpus bursae with three small, subequal signa.

Types.—Holotype (*Holcocera crassicornella*) ♂, "Florida" [hand-written label]; "Type" [red label]; "*H*[*olcocera*] *crassicornella* Dietz, Type. "Holotype is missing the abdomen; other body parts are within a gelatin capsule on pin. In the USNM.

Lectotype (*Blastobasis eriobotryae*) ♂, [designated by Adamski and Hodges 1996], "From Loquat [*Eriobotrya japonica*], Miami Fl[orid]a, iss[ued]. July 1910" [hand-written label]; "USNM Type no. 19233" [red label], [lectotype not dissected]. The lectotype is in the USNM. Fifteen paralectotypes are in the USNM and two paralectotypes are in The Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Host.—*Eriobotrya japonica* (Thunberg) Lindberg (Rosaceae); *Acer rubrum* Linnaeus (Aceraceae).

Distribution.—Southern Florida.

Holcocera grenadensis Walsingham 1897, ***new combination***

(Figs. 3, 7, 10)

Blastobasis grenadensis Walsingham 1897: 92; Becker 1984: 41.

Diagnosis.—Forewing veins streaked with pale-brown scales; uncus narrow throughout length; dorsal margin of gnathos notched; cornuti subequal in size.

Description.—*Head*: Frontoclypeus and vertex pale grayish brown; scape and pedicel pale grayish brown intermixed with darker brown scales, flagellum pale grayish brown; pecten pale grayish brown; with first flagellomere notched; outer surface of labial palpus mostly with pale-brown scales intermixed with white and brown scales, inner surface white; proboscis white.

Thorax: Mesonotum brown with a nar-

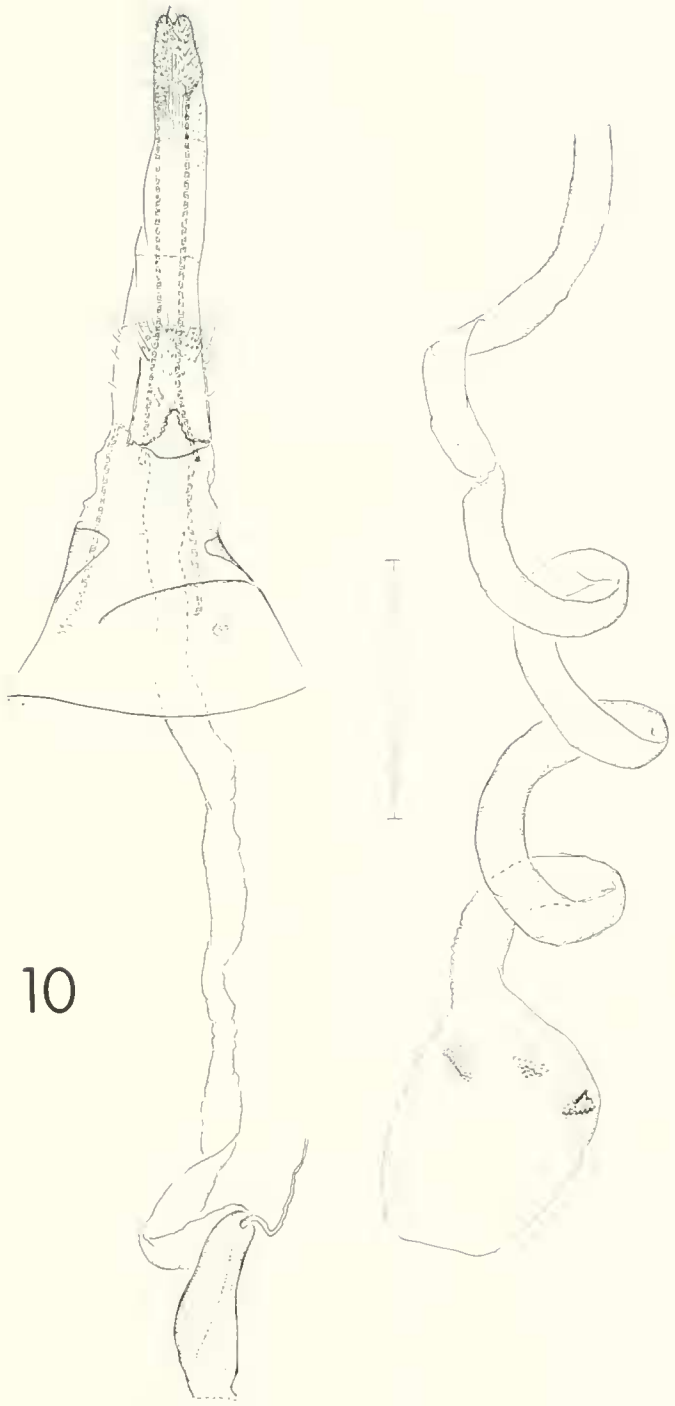


Fig. 10. Female genitalia of *Holcocera grenadensis*. Scale = 1.0 mm.

row transverse band of pale-brown scales intermixed with white scales; tegula with pale-brown scales intermixed with white scales basally, brown distally. *Legs*: as for *H. guilandinae*, except banding on tarsomeres is absent in some specimens. *Forewing* (Fig. 3): Length 5.9–6.2 mm (n = 5): Ground color brown intermixed with pale-brown scales, irregularly streaked with pale grayish-brown scales above veins; three discal spots present; ventral surface pale brown. *Hindwing*: Dorsal and ventral surfaces uniformly brownish gray, darkening to outer margin. Venation not studied.

Abdomen: Pale brown.

Male genitalia (Fig. 7): Uncus narrow throughout length, setose; dorsal margin of gnathos notched; valval costa as in *H. crassicornella*; anellus and aedeagus as in *H. crassicornella*.

Female genitalia (Fig. 10): As in *H. crassicornella*.

Types.—Lectotype here designated ♀, "Type" [round label]; "Balthazar, (windward side), Grenada, W.I., H.H. Smith, 4-V"; "Walsingham Collection, 1910-427, 65,285, Type ♀"; "Adamski genitalia slide, BM 26560." Four paralectotypes (1 ♂, 3 ♀) from Mount Gay Estate, (leeward side) and Balthazar (windward side) Grenada, and Dominica. The lectotype and paralectotypes are in The Natural History Museum, London, England.

Host.—Unknown.

Distribution.—Grenada, Dominica.

Remarks.—Female *grenadensis* cannot be distinguished from female *crassicornella*.

Discussion

Holcocera crassicornella and *H. grenadensis* are more closely related to each other than to *H. guilandinae*. Both species share a costal lobe of valva that is acutely arched dorsally at the base, anellus that is deeply notched apically, aedeagal cornuti present, and inception of ductus seminalis on a modified part of the ductus bursae. In addition, female genitalia of *H. crassicornella* cannot be distinguished from the genitalia of *H. grendensis*. This may not only indicate phylogenetic conservatism within a part of *Holcocera*, but a close kinship between these species. Although these three species belong to a monophyletic group (Adamski & Brown 1989), their phylogenetic relationships cannot be determined without further analysis.

Acknowledgments

I thank K. Sattler, M. Shaffer, and K. Tuck of the Natural History Museum, London, England, for their help and cooperation during my visit to examine type specimens; D. Ferguson, Systematic Entomology Laboratory, USDA, Washington D.C., D. Habeck, Center for Arthropod Systematics, Florida State Collection of Arthropods, Gainesville, Florida, and B. Landry, Agriculture Canada, Canadian National Collection, Ottawa, for the loans of specimens; and Carl Hansen of the Office of Imaging, Printing and Photographic Services, Smithsonian Institution, for Figs. 1–3. This research was supported in part by Harvard University Ernst Mayr Grant, National Science Foundation Grant no. BSR-8501212, Sigma Xi Grant-in-Aid, and the Mississippi Agricultural and Forestry Experiment Station.

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